



List of common misconceptions

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This **list of common misconceptions** corrects erroneous beliefs that are currently widely held about notable topics. Each misconception and the corresponding facts have been discussed in published literature. Note that each entry is formatted as a correction; the misconceptions themselves are implied rather than stated.

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Arts and culture

Food and cooking

- Searing meat may cause it to lose moisture in comparison to an equivalent amount of cooking without searing. Generally, the value in searing meat is that it creates a brown crust with a rich flavor via the Maillard reaction.^{[1][2]}
- Food items cooked with wine or liquor retain alcohol according to a study which found that some of the alcohol remains: 25 percent after one hour of baking or simmering, and 10 percent after two hours; in either case, however, the amount consumed while eating a dish prepared with alcohol will rarely if ever contain sufficient alcohol to cause even low levels of intoxication.^{[3][4]}
- There is no consistent data supporting monosodium glutamate (MSG) as triggering migraine headache exacerbation or other symptoms of so-called Chinese restaurant syndrome. Although there have been reports of an MSG-sensitive subset of the population, this has not been demonstrated in placebo-controlled trials.^{[5][6]}
- Microwave ovens do not cook food from the inside out. Penetration depth of microwaves is dependent on food composition and the frequency, with lower microwave frequencies (longer wavelengths) penetrating further.
- Placing metal inside a microwave oven does not damage the oven's electronics. There are, however, other safety-related issues: electrical arcing may occur on pieces of metal not designed for use in a microwave oven, and metal objects may become hot enough to damage food, skin, or the interior of the oven. Metallic objects designed for microwave use can be used in a microwave with no danger; examples include the metallized surfaces used in browning sleeves and pizza-cooking platforms.^[7] Large metallic objects without spikes and narrow apertures may not cause any problems, e.g. a spoon in a cup.
- The functional principle of a microwave oven is dielectric heating rather than resonance frequencies of water, and microwave ovens can therefore operate at many frequencies. Water molecules are exposed to intense electromagnetic fields in strong non-resonant microwaves to create heat. The 22 GHz resonant frequency of isolated water molecules has a wavelength too short to penetrate common foodstuffs to useful depths. The typical oven frequency of 2.45 GHz was chosen partly due to its ability to penetrate a food object of reasonable size, and partly to avoid interference with communication frequencies in use when microwave ovens became commercially available.^[8]
- Twinkies have a shelf life of approximately 45 days^[9] (25 in their original formulation)—far shorter than some people believe.^[10] They generally remain on a store shelf for only 7 to 10 days.^[11]
- Fortune cookies, despite being associated with Chinese cuisine in the United States, were invented and brought to the U.S. by the Japanese.^[12] The cookies are extremely rare in China, where they are seen as symbols of American cuisine.^[13]
- A standard cup of brewed coffee has more caffeine than a single shot of espresso. The belief that the reverse is true results from espresso having a higher concentration of caffeine, which is offset by the

much larger volume overall of a regular cup of coffee.^[14]

Legislation and crime

- It is rarely necessary to wait 24 hours before filing a missing person report. In instances where there is evidence of violence or of an unusual absence, law enforcement agencies in the United States often stress the importance of beginning an investigation promptly.^[15] The UK government website says explicitly in large type, "You don't have to wait 24 hours before contacting the police".^[16]
- Entrapment law in the United States does not require police officers to identify themselves as police in the case of a sting or other undercover work, and police officers may lie in doing such work.^[17] The law is instead specifically concerned with enticing people to commit crimes they would not have considered in the normal course of events.^[18]
- No one ever claimed in court that Twinkies made them commit a crime. In the murder trial of Dan White, the defense attorneys successfully argued diminished capacity as a result of severe depression. While eating Twinkies was given as evidence of depression, it was never claimed to be the cause of the murders. Despite this, people often claim that White's attorneys argued that Twinkies made him commit the murders.^[19]
- The Geneva Convention permits the use of the M2 Browning .50-caliber machine gun against enemy personnel. The belief to the contrary may have arisen from restrictions imposed by the U.S. military during the Korean or Vietnam Wars due to ammunition shortages; a similar tactically-based restriction on the use of the M40 recoilless rifle's .50-caliber spotting rifle may also have been erroneously applied to all weapons of that caliber under a belief that it was legally mandated.^{[20][21][22]}

Literature

Music

- The Austrian national anthem is "Land der Berge, Land am Strome" ("Land of the Mountains, Land on the River").^[23] "Edelweiss" is not the national anthem of Austria, but an original composition created for the musical *The Sound of Music*.
- "Twinkle Twinkle Little Star" was not composed by Wolfgang Amadeus Mozart when he was 5 years old; he only composed variations on the tune, which originated from a French folk song, and at the age of 25 or 26.^[24]

Religion

Buddhism

- The historical Buddha was not obese. The "chubby Buddha" or "laughing Buddha" is a 10th-century Chinese folk hero by the name of Budai. In Chinese Buddhist culture, Budai came to be revered as an incarnation of Maitreya, the Bodhisattva who will become a Buddha to restore Buddhism after the teachings of the historical Buddha, Siddhārtha Gautama, have been forgotten.^[25]
- The Buddha is not a god. In early Buddhism, Siddhārtha Gautama possessed no salvific powers and strongly encouraged "self-reliance, self-discipline and individual striving."^[26] However, in later developments of Mahāyāna Buddhism, notably in the Pure Land (Jìngtǔ) school of Chinese Buddhism, the Amitābha Buddha was thought to be a savior. Through faith in the Amitābha Buddha, one could be

reborn in the western Pure Land. Although in Pure Land Buddhism the Buddha is considered a savior, he is still not considered a god in the common understanding of the term.^[27]

Christianity and Judaism

- The doctrine of the trinity and the word itself are nowhere to be found in the Bible. The concept was developed by the church fathers in the 4th and 5th centuries.^{[28][29][30][31][32][33][34][35]}
- The forbidden fruit mentioned in the Book of Genesis is never identified as an apple,^[36] a misconception widely depicted in Western art. The original Hebrew texts mention only *tree* and *fruit*. Early Latin translations use the word *mali*, which can be taken to mean both "evil" and "apple". In early Germanic languages the word "apple" and its cognates usually meant simply "fruit". German and French artists commonly depict the fruit as an apple from the 12th century onwards, and John Milton's *Areopagitica* from 1644 explicitly mentions the fruit as an apple.^[37] Jewish scholars have suggested that the fruit could have been a grape, a fig, wheat, an apricot, or an etrog.^[38]
- There is no evidence that Jesus was born on December 25.^[39] The Bible never claims a date of December 25, but may imply a date closer to September.^[39] The fixed date is attributed to Pope Julius the First because in the year 350 CE he declared the twenty-fifth of December the official date of celebration.^{[40][41]} The date may have initially been chosen to correspond with either the day exactly nine months after Christians believe Jesus to have been conceived,^{[42][43]} the date of the Roman winter solstice,^[44] or one of various ancient winter festivals.^{[42][45]}
- The Bible does not say that exactly three magi came to visit the baby Jesus, nor that they were kings, or rode on camels, or that their names were Casper, Melchior, and Balthazar. Matthew 2 has traditionally been combined with Isaiah 60:1–3.

Arise, shine, for your light has come, and the glory of the Lord has risen upon you. ²For behold, darkness shall cover the earth, and thick darkness the peoples; but the Lord will arise upon you, and his glory will be seen upon you. ³And nations shall come to your light, and kings to the brightness of your rising.

Three magi are supposed because three gifts are described, and artistic depictions of the nativity have almost always depicted three magi since the 3rd century.^[46] The Bible specifies no interval between the birth and the visit, and artistic depictions and the closeness of the traditional dates of December 25 and January 6 encourage the popular assumption that the visit took place in the same season as the birth, but later traditions varied, with the visit taken as occurring up to two years later. This maximum interval explained Herod's command at Matthew 2:16–18 that the Massacre of the Innocents included boys up to two years old. More recent commentators, not tied to the traditional feast days, may suggest a variety of intervals.^[47] (Matthew 2:11 (<http://tools.wmflabs.org/bibleversefinder2/?book=Matthew&verse=2:11&src=NRSV>)).^[48]

- The idea that Mary Magdalene was a prostitute before meeting Jesus is not found in the Bible. In the Gospel of Luke, there is a passage about a woman with a reputation for sinning (which may well mean prostitution) immediately before the story introducing Mary Magdalene for the first time. The Catholic Church, since Pope Gregory I's time in the 6th century if not before, had historically assumed that the two accounts refer to the same woman, meaning that before her conversion to Christianity Mary Magdalene was a prostitute. But there is no direct evidence from the Bible over such a link, most modern

scholars assert that she was most likely not a prostitute, and even the Catholic Church no longer suggests that the two passages from Luke refer to the same person.^{[49][50][51]}

- Saul of Tarsus is not recorded as having deliberately changed his name in the Acts of the Apostles or elsewhere in the Bible following his conversion experience on the road to Damascus. He was born a Jew with a Roman citizenship inherited from his father, and thus carried both a Hebrew and a Latin name since his birth. He stopped using his Jewish name "Saul" (Hebrew: שאול, Modern *Sha'ul*, Tiberian *Šā'ûl*) and used instead his Roman name "Paul" (Latin: *Paulus*) when he became an international missionary; whether that change was to reflect the new contexts he was in or as a reflection of change in his inward being is not found in the Bible or any contemporaneous sources, and is merely speculative. Luke indicates the coexistence of the names in Acts 13:9: "...Saul, who also is called Paul...".^{[52][53]}
- The term "Immaculate Conception" was not coined to refer to the virgin birth of Jesus,^[note 1] nor does it reference a supposed belief in the virgin birth of Mary, his mother. Instead, it denotes a Roman Catholic belief that Mary was not in a state of original sin from the moment of her own conception.^[54]
- Roman Catholic dogma does not say that the pope is either sinless or always infallible.^[55] Catholic dogma since 1870 does state that a dogmatic teaching contained in divine revelation that is promulgated by the pope (deliberately, and under certain very specific circumstances) is free from error, although official invocation of papal infallibility is rare. While most theologians state that canonizations meet the requisites,^[56] aside from that, most recent popes have finished their reign without a single invocation of infallibility. Otherwise, even when speaking in his official capacity, dogma does not hold that he is free from error.
- Members of The Church of Jesus Christ of Latter-day Saints (LDS Church) no longer practice polygamy, although it was historically practiced in the LDS Church.^{[57][58][59][60]} Currently, the LDS Church excommunicates any members that practice polygamy within the organization.^[61] However, some Mormon fundamentalist sects still practice polygamy within their groups.^{[62][63]}



No part of the Bible describes Mary Magdalene as a prostitute.

Islam

- A fatwā is a non-binding legal opinion issued by an Islamic scholar under Islamic law; it is therefore commonplace for fatwās from different authors to disagree. The popular misconception^{[64][65]} that the word means a death sentence probably stems from the fatwā issued by Ayatollah Ruhollah Khomeini of Iran in 1989 regarding the author Salman Rushdie, whom he stated had earned a death sentence for blasphemy. This event led to fatwās gaining widespread media attention in the West.^[66]
- The word "jihad" does not always mean "holy war"; literally, the word in Arabic means "struggle". While there is such a thing as "jihad bil saif", or jihad "by the sword",^[67] many modern Islamic scholars usually say that it implies an effort or struggle of a spiritual kind.^{[68][69]} Scholar Louay Safi asserts that "misconceptions and misunderstandings regarding the nature of war and peace in Islam are widespread in both the Muslim societies and the West", as much following 9/11 as before.^[70]
- The Quran does not promise martyrs 72 virgins in heaven. It does mention companions, *houris*, to all people—martyr or not—in heaven, but no number is specified. The source for the 72 virgins is a hadith

in Sunan al-Tirmidhi by Imam Tirmidhi.^{[71][72]} Hadiths are sayings and acts of the prophet Mohammed as reported by others, and as such they are not part of the Quran itself. Muslims are not meant to necessarily believe all hadiths, and that applies particularly to those hadiths that are weakly sourced, such as this one.^[73] Furthermore, the correct translation^[7] of this particular hadith is a matter of debate.^[71]

Sports

- Abner Doubleday did not invent baseball, nor did it originate in Cooperstown, New York. It is believed to have evolved from other bat-and-ball codes such as cricket and rounders and first taken its modern form in New York City.^{[74][75]} (See Origins of baseball.)
- The black belt in martial arts does not necessarily indicate expert level or mastery. It was introduced for judo in the 1880s to indicate competency of all of the basic techniques of the sport. Promotion beyond black belt varies among different martial arts. In judo and some other Asian martial arts, holders of higher ranks are awarded belts with alternating red and white panels, and the highest ranks with solid red belts.^[76]

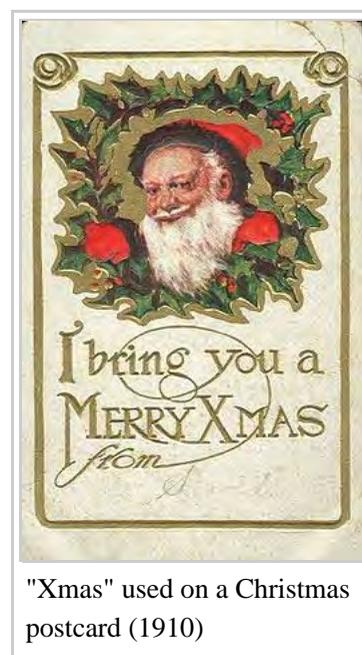
Words and phrases

- Non-standard, slang or colloquial terms used by English speakers are sometimes alleged not to be real words, despite appearing in numerous dictionaries,^[77] "irregardless" is sometimes dismissed as "not a word".^{[78][79]} All words in English became accepted by being commonly used for a certain period of time; thus there are many informal words currently regarded as "incorrect" in formal speech or writing, but the idea that they are not words is a misconception.^[80] Examples of words that are sometimes alleged not to be words include "conversate", "funnest", "mentee", "impactful", and "thusly",^[81] all of which appear in numerous dictionaries as English words.^{[82][83]}
- The word "fuck" did not originate in Christianized Anglo-Saxon England (7th century CE) as an acronym for "Fornication Under Consent of King"; nor did it originate as an acronym for "For Unlawful Carnal Knowledge", either as a sign posted above adulterers in the stocks, or as a criminal charge against members of the British Armed Forces; nor did it originate during the 15th-century Battle of Agincourt as a corruption of "pluck yew" (an idiom falsely attributed to the English for drawing a longbow).^[84] Modern English was not spoken until the 16th century, and words such as "fornication" and "consent" did not exist in any form in English until the influence of Anglo-Norman in the late 12th century. The earliest certain recorded use of "fuck" in English comes from c. 1475, in the poem "Flen flyys", where it is spelled *fuccant* (conjugated as if a Latin verb meaning "they fuck"). It is of Proto-Germanic origin, and is related to either Dutch *fokken* and German *ficken* or Norwegian *fukka*.^[85]
- The word "crap" did not originate as a back-formation of British plumber Thomas Crapper's surname, nor does his name originate from the word "crap", although the surname may have helped popularize the word.^[86] The surname "Crapper" is a variant of "Cropper", which originally referred to someone who harvested crops.^{[87][88]} The word "crap" ultimately comes from Medieval Latin *crappa*, meaning "chaff".^[89]



Marcos Torregrosa wearing a black belt with a red bar. In some martial arts, such as Brazilian Jiu Jitsu and Judo, red belts indicate a higher rank than black. In some cases, a solid red belt is reserved for the founder of the art, and in others, higher degrees of black belts are shown by red stripes.

- The expression "rule of thumb" did not originate from a law allowing a man to beat his wife with a stick no thicker than his thumb, and there is no evidence that such a law ever existed.^[90] The true origin of this phrase remains uncertain, but the false etymology has been broadly reported in media including *The Washington Post* (1989), CNN (1993), and *Time* magazine (1983).^[91]
- "Golf" did not originate as an acronym of "Gentlemen Only, Ladies Forbidden".^[92] The word's true origin is unknown, but it existed in the Middle Scots period.^{[93][94][95]}
- The word "gringo" did not originate during the Mexican–American War (1846–48), the Venezuelan War of Independence (1811–23), the Mexican Revolution (1910–20), or in the American Old West (c. 1865–99) as a corruption of the lyrics "green grow" in either "Green Grow the Lilacs" or "Green Grow the Rushes, O" sung by US-American soldiers or cowboys;^[96] nor did it originate during any of these times as a corruption of "Green go home!", falsely said to have been shouted at green-clad American troops.^[97] The word originally simply meant "foreigner", and is probably a corruption of Spanish *griego*, "Greek".^[98]
- "420" did not originate from the Los Angeles police or penal code for marijuana use.^[99] In California, Police Code 420 means "juvenile disturbance",^[100] and California Penal Code section 420 prohibits the obstruction of access to public land.^{[99][101]} The use of "420" started in 1971 at San Rafael High School, where it indicated the time, 4:20 pm, when a group of students would go to smoke under the statue of Louis Pasteur.^[99]
- The word "the" was never pronounced or spelled "ye" in Old or Middle English.^[102] The confusion derives from the use of the character thorn (þ) in abbreviations of the word "the", which in Middle English text (ſ) looked similar to a y with a superscript e.^{[103][104]}
- "Xmas" did not originate as a secular plan to "take the Christ out of Christmas".^[105] X stands for the Greek letter chi, the starting letter of Χριστός (*Christos*), or "Christ" in Greek.^[106] The use of the word "Xmas" in English can be traced to the year 1021 when "monks in Great Britain...used the X as abbreviation while transcribing classical manuscripts into Old English" in place of "Christ".^[105] The *Oxford English Dictionary's* "first recorded use of 'Xmas' for 'Christmas' dates back to 1551."^[107]
- Although the expression "the enemy of my enemy is my friend" is often described as an Arabic proverb, there is no evidence of such an origin. Its exact origin is unknown. The Latin saying *amicus meus, inimicus inimici mei* ("my friend, the enemy of my enemy") was widely used in 18th century Europe.^[108]
- The Chevrolet Nova sold very well in Latin American markets; General Motors did not need to rename the car. While "*no va*" does mean "it doesn't go" in Spanish, "*nova*" is understood as "new" and drivers in Mexico and Venezuela where it was first sold bought it eagerly. There was no need to change the model name,^[109] as is still claimed there was.^{[110][111]}



"Xmas" used on a Christmas postcard (1910)

History

Ancient to early modern history

- Vomiting was not a regular part of Roman dining customs.^[112] In ancient Rome, the architectural feature called a *vomitorium* was the entranceway through which crowds entered and exited a stadium, not a special room used for purging food during meals.^[113]
- Roman gladiators did not ritually say "Hail Emperor, we who are about to die salute you" before combat. Two ancient Roman historians recount that in the year 52 AD, a large group of criminals condemned to fight each other to the death in a large staged naval battle on an artificial lake greeted Emperor Claudius that way; he may possibly have pardoned them as a result. That is the only recorded use of the phrase in ancient Rome.^[114]
- The Library of Alexandria was not destroyed by the Muslim Army during the capture of the city in 641. A common misconception alleged that Caliph Umar ordered the destruction based on the reasoning "If those books are in agreement with the Quran, we have no need of them; and if these are opposed to the Quran, destroy them" (or its variation). This story did not appear in writing until hundreds of years after the alleged incident (most famously in the work of Bar Hebraeus in the 13th century) and contemporary accounts of the Arab invasion do not include any account of the library's destruction. Modern consensus suggests the library had likely already been destroyed centuries before this incident.^{[115][116]} (It is instead believed that the Library of Caesarea, a key repository of Christian literature, was the library destroyed near this time.)^[117]
- It is true that life expectancy in the Middle Ages and earlier was low; however, one should not infer that people usually died around the age of 30.^[118] In fact, earlier low life expectancies were very strongly influenced by high infant mortality, and the life expectancy of people who lived to adulthood was much higher. A 21-year-old man in medieval England, for example, could by one estimate expect to live to the age of 64.^[119]
- There is no evidence that Vikings wore horns on their helmets.^[120] In fact, the image of Vikings wearing horned helmets stems from the scenography of an 1876 production of the *Der Ring des Nibelungen* opera cycle by Richard Wagner.^[121]
- Similarly, Vikings did not drink out of the skulls of vanquished enemies. This was based on a mistranslation of the skaldic poetic use of *ór bjúgvíðum hausa* (branches of skulls) to refer to drinking horns.^[122]
- King Canute did not command the tide to reverse in a fit of delusional arrogance.^[123] His intent that day, if the incident even happened, was most likely to prove a point to members of his privy council that no man is all-powerful, and we all must bend to forces beyond our control, such as the tides.
- There is no evidence that iron maidens were invented in the Middle Ages or even used for torture. Instead they were pieced together in the 18th century from several artifacts found in museums in order to create spectacular objects intended for (commercial) exhibition.^[124]
- The plate armor of European soldiers did not stop soldiers from moving around or necessitate a crane to get them into a saddle. They would as a matter of course fight on foot and could mount and dismount without help. In fact, soldiers equipped with plate armor were more mobile than those with mail armor (chain armor), as mail was heavier and required stiff padding beneath due to its pliable nature.^[125] It is true that armor used in tournaments in the late Middle Ages was significantly heavier than that used in warfare,^[126] which may have contributed to this misconception.
- Whether chastity belts, devices designed to prevent women from having sexual intercourse, were invented in medieval times is disputed by modern historians. Most existing chastity belts are now



Vomitorium to a Roman amphitheatre in Toulouse

thought to be deliberate fakes or anti-masturbatory devices from the 19th and early 20th centuries. The latter were made due to the widespread belief that masturbation could lead to insanity, and were mostly bought by parents for their teenage children.^[127]

- Medieval Europeans did not believe Earth was flat; in fact, from the time of the ancient Greek philosophers Plato and Aristotle, belief in a spherical Earth remained almost universal among European intellectuals. As a result, Christopher Columbus's efforts to obtain support for his voyages were hampered not by belief in a flat Earth but by valid worries that the East Indies were farther than he realized.^[128] If the Americas had not existed, he would surely have run out of supplies before reaching Asia.
- Columbus never reached any land that now forms part of the mainland United States of America; most of the landings Columbus made on his four voyages, including the initial October 12, 1492 landing (the anniversary of which forms the basis of Columbus Day), were on Caribbean islands which today are independent countries. Columbus was also not the first European to visit the Americas: at least one explorer, Leif Ericson, preceded him by reaching what is believed to be the island now known as Newfoundland, part of modern Canada, though he never made it to the mainland.^{[129][130]}
- Marco Polo did not import pasta from China,^[131] a misconception which originated with the *Macaroni Journal*, published by an association of food industries with the goal of promoting the use of pasta in the United States.^[132] Marco Polo describes a food similar to "lagana" in his *Travels*, but he uses a term with which he was already familiar. Durum wheat, and thus pasta as it is known today, was introduced by Arabs from Libya, during their conquest of Sicily in the late 7th century, according to the newsletter of the National Macaroni Manufacturers Association,^[133] thus predating Marco Polo's travels to China by about six centuries.
- Contrary to the popular image of the Pilgrim Fathers, the early settlers of the Plymouth Colony did not wear all black, and their capotains (hats) were shorter and rounder than the widely depicted tall hat with a buckle on it. Instead, their fashion was based on that of the late Elizabethan era: doublets, jerkins and ruffs. Both men and women wore the same style of shoes, stockings, capes, coats and hats in a range of colors including reds, yellows, purples, and greens.^[134] According to Plimoth Plantation historian James W. Baker, the traditional image was formed in the 19th century when buckles were a kind of emblem of quaintness.^{[135][136]}
- The accused at the Salem witch trials were not burned at the stake; about 15 died in prison, 19 were hanged and one was pressed to death.^{[137][138]}
- Marie Antoinette did not say "let them eat cake" when she heard that the French peasantry were starving due to a shortage of bread. The phrase was first published in Rousseau's *Confessions* when Marie was only nine years old and most scholars believe that Rousseau coined it himself, or that it was said by Maria-Theresa, the wife of Louis XIV. Even Rousseau (or Maria-Theresa) did not use the exact words but actually *Qu'ils mangent de la brioche*, "Let them eat brioche" (a rich type of bread). Marie Antoinette was an unpopular ruler; therefore, people attribute the phrase "let them eat cake" to her, in keeping with her reputation as being hard-hearted and disconnected from her subjects.^[139]
- George Washington did not have wooden teeth. His dentures were made of gold, hippopotamus ivory,



Medieval depiction of a spherical Earth.

lead, animal teeth (including horse and donkey teeth),^[140] and probably human teeth purchased from slaves.^[141]

- The signing of the United States Declaration of Independence did not occur on July 4, 1776. After the Second Continental Congress voted to declare independence on July 2, the final language of the document was approved on July 4, and it was printed and distributed on July 4–5.^[142] However, the actual signing occurred on August 2, 1776.^[143]
- Benjamin Franklin did not propose that the wild turkey be used as the symbol for the United States instead of the bald eagle. While he did serve on a commission that tried to design a seal after the Declaration of Independence, his proposal was an image of Moses. His objections to the eagle as a national symbol and preference for the turkey were stated in a 1784 letter to his daughter in response to the Society of the Cincinnati's use of the former; he never expressed that sentiment publicly.^{[144][145]}
- There was never a bill to make German the official language of the United States that was defeated by one vote in the House of Representatives, nor has one been proposed at the state level. In 1794, a petition from a group of German immigrants was put aside on a procedural vote of 42 to 41, that would have had the government publish some laws in German. This was the basis of the Muhlenberg legend, named after the Speaker of the House at the time, Frederick Muhlenberg, a speaker of German descent who abstained from this vote.^{[146][147][148]}

Modern history

- Napoleon Bonaparte was not short. He was actually slightly taller than the average Frenchman of his time.^{[149][150]} After his death in 1821, the French emperor's height was recorded as 5 feet 2 inches in *French* feet, which in English measurements is 5 feet 7 inches (1.69 m).^{[151][152]} Some believe that he was nicknamed *le Petit Caporal* (The Little Corporal) as a term of affection.^[153] Napoleon was often accompanied by his imperial guard, who were selected for their height^[154]—this could have contributed to a perception that he was relatively short.
- Cinco de Mayo is not Mexico's Independence Day, but the celebration of the Mexican Army's victory over the French in the Battle of Puebla on May 5, 1862. Mexico's Declaration of Independence from Spain in 1810 is celebrated on September 16.^{[155][156]}
- The Great Chicago Fire of 1871 was not caused by Mrs. O'Leary's cow kicking over a lantern. A newspaper reporter invented the story to make colorful copy.^[157]
- The claim that Frederic Remington, on assignment to Cuba in 1897, telegraphed William Randolph Hearst that "...There will be no war. I wish to return" and that Hearst responded, "Please remain. You furnish the pictures, and I'll furnish the war" is unsubstantiated. This anecdote was originally included in a book by James Creelman, though there is no evidence that the telegraph exchange ever happened, and substantial evidence that it did not.^{[158][159]}
- Immigrants' last names were not Americanized (voluntarily, mistakenly, or otherwise) upon arrival at Ellis Island. Officials there kept no records other than checking ship manifests created at the point of origin, and there was simply no paperwork which would have created such an effect, let alone any law. At the time in New York, anyone could change the spelling of their name simply by using that new spelling.^[160]



Napoleon on the Bellerophon, a painting of Napoleon I by Charles Lock Eastlake. Napoleon was taller than his nickname, The Little Corporal, suggests.

- The common image of Santa Claus as a good old man in red robes was not created by The Coca-Cola Company as an advertising gimmick. Despite being historically represented with different characteristics in different colours of robes, Santa Claus had already taken his modern form in popular culture and seen extensive use in other companies' advertisements and other mass media at the time Coca-Cola began using his image in the 1930s.^[161]
- Italian dictator Benito Mussolini did not "make the trains run on time". Much of the repair work had been performed before Mussolini and the Fascists came to power in 1922. Accounts from the era also suggest that the Italian railways' legendary adherence to timetables was more propaganda than reality.^[162]
- There was no widespread outbreak of panic across the United States in response to Orson Welles' 1938 radio adaptation of H.G. Wells' *The War of the Worlds*. Only a very small share of the radio audience was even listening to it, and isolated reports of scattered incidents and increased call volume to emergency services were played up the next day by newspapers, eager to discredit radio as a competitor for advertising. Both Welles and CBS, which had initially reacted apologetically, later came to realize that the myth benefited them and actively embraced it in their later years.^{[163][164]}
- There is no evidence of Polish cavalry mounting a brave but futile charge against German tanks using lances and sabres during the German invasion of Poland in 1939. This story may have originated from German propaganda efforts following the charge at Krojanty, in which a Polish cavalry brigade surprised German infantry in the open, and successfully charged and dispersed them, until driven off by armoured cars. While Polish cavalry still carried the sabre for such opportunities, they were trained to fight as highly mobile, dismounted cavalry (dragoons) and issued with light anti-tank weapons.^{[165][166]}
- During the occupation of Denmark by the Nazis during World War II, King Christian X of Denmark did not thwart Nazi attempts to identify Jews by wearing a yellow star himself. Jews in Denmark were never forced to wear the Star of David. The Danish resistance did help most Jews flee the country before the end of the war.^[167]
- Albert Einstein did not fail mathematics classes (never "flunked a math exam") in school. Upon seeing a column making this claim, Einstein said "I never failed in mathematics... Before I was fifteen I had mastered differential and integral calculus."^{[168][169]} Einstein did however fail his first entrance exam into the Swiss Federal Polytechnic School (ETH) in 1895, when he was two years younger than his fellow students but scored exceedingly well in the mathematics and science sections, then passed on his second attempt.^[170]
- Actor Ronald Reagan was never seriously considered for the role of Rick Blaine in the 1942 film classic *Casablanca*, eventually played by Humphrey Bogart. This belief came from an early studio press release announcing the film's production that used his name to generate interest in the film. But by the time it had come out, Warner Bros. knew that Reagan was unavailable for any roles in the foreseeable future since he was no longer able to defer his entry into military service.^[171] Studio records show that producer Hal B. Wallis had always wanted Bogart for the part.^{[172][173]}
- U.S. Senator George Smathers never gave a speech to a rural audience describing his opponent, Claude Pepper, as an "extrovert" whose sister was a "thespian", in the apparent hope they would confuse them with similar-sounding words like "pervert" and "lesbian". *Time*, which is sometimes cited as the source,



Albert Einstein, photographed at 14, did not fail mathematics at school.

described the story of the purported speech as a "yarn" at the time,^[174] and no Florida newspaper reported such a speech during the campaign. The leading reporter who covered Smathers said he always gave the same boilerplate speech. Smathers had offered US\$10,000 to anyone who could prove he had made the speech; it was never claimed.^[175]

- John F. Kennedy's words "Ich bin ein Berliner" are standard German for "I am a Berliner."^{[176][177]} An urban legend has it that due to his use of the indefinite article *ein*, *Berliner* is translated as *jelly doughnut*, and that the population of Berlin was amused by the supposed mistake. The word *Berliner* is not commonly used in Berlin to refer to the *Berliner Pfannkuchen*; they are usually called *ein Pfannkuchen*.^[178]
- African American intellectual and activist W.E.B. Du Bois did not renounce his U.S. citizenship while living in Ghana shortly before his death,^[179] as is often claimed.^{[180][181][182]} In early 1963, due to his membership in the Communist Party and support for the Soviet Union, the U.S. State Department did not renew his passport while he was already in Ghana overseeing the creation of the *Encyclopedia Africana*. After leaving the embassy, he stated his intention to renounce his citizenship in protest. But while he took Ghanaian citizenship, he never went through the process of renouncing his American citizenship,^[183] and may not even have intended to.^[179]
- When bartender Kitty Genovese was murdered outside her Queens apartment in 1964, 37 neighbors did not stand idly by and watch, not calling the police until after she was dead, as *The New York Times* initially reported^[184] to widespread public outrage that persisted for years. Later reporting established that the police report the *Times* had initially relied on was inaccurate, that Genovese had been attacked twice in different locations, and while the many witnesses heard the attack they only heard brief portions and did not realize what was occurring, with only six or seven actually reporting seeing anything. Some called police; one who did not said "I didn't want to get involved", an attitude which later came to be attributed to all the residents who saw or heard part of the attack.^[185]
- The Rolling Stones were not performing "Sympathy for the Devil" at the 1969 Altamont Free Concert when Meredith Hunter was stabbed to death by a member of the local Hells Angels chapter that was serving as security. While the incident that culminated in Hunter's death began while the band was performing the song, prompting a brief interruption before the Stones finished it, it concluded several songs later as the band was performing "Under My Thumb".^{[186][187]} The misconception arose from mistaken reporting in *Rolling Stone*.^[188]
- While it was praised by one architectural magazine prior to its construction as "the best high apartment of the year", the Pruitt–Igoe housing project in St. Louis, Missouri, considered to epitomize the failures of urban renewal in American cities after it was demolished in the early 1970s, never won any awards for its design.^[189] The architectural firm that designed the buildings did win an award for an earlier St. Louis project, which may have been confused with Pruitt–Igoe.^[190]
- Although popularly known as the "red telephone", the Moscow–Washington hotline was never a telephone line, nor were red phones used. The first implementation of the hotline used teletype equipment, which was replaced by facsimile (fax) machines in 1988. Since 2008, the hotline has been a secure computer link over which the two countries exchange emails.^[191] Moreover, the hotline links the Kremlin to the Pentagon, not the White House.^[192]

Science and technology

Astronomy

- The Great Wall of China is not, as is claimed, the only human-made object visible from the Moon or from space. None of the Apollo astronauts reported seeing *any* specific human-made object from the Moon, and even Earth-orbiting astronauts can barely see it. City lights, however, are easily visible on the night side of Earth from orbit.^[193] Shuttle astronaut Jay Apt has been quoted as saying that "the Great Wall is almost invisible from only 180 miles (290 km) up."^[194] (See *Man-made structures visible from space*.) ISS commander Chris Hadfield attempted to find it from space, but said that it was "hard as it's narrow and dun-colored."^[195]
- Black holes have the same gravitational effects as any other equal mass in their place. They will draw objects nearby towards them, just as any other planetary body does, except at very close distances.^[196] If, for example, the Sun were replaced by a black hole of equal mass, the orbits of the planets would be essentially unaffected. A black hole *can* act like a "cosmic vacuum cleaner" and pull a substantial inflow of matter, but only if the star it forms from is already having a similar effect on surrounding matter.^[197]
- Seasons are not caused by the Earth being closer to the Sun in the summer than in the winter. In fact, the Earth is farthest from the Sun when it is summer in the Northern Hemisphere. Seasons are caused by Earth's 23.4-degree axial tilt. In July, the Northern Hemisphere is tilted towards the Sun resulting in longer days and more direct sunlight; in January, it is tilted away. The seasons are reversed in the Southern Hemisphere, which is tilted towards the Sun in January and away from the Sun in July.^{[198][199]}
- Meteorites are not necessarily hot when they reach the Earth's surface. In fact, many meteorites are found with frost on them. As they enter the atmosphere, having been warmed only by the sun, meteors have a temperature below freezing. The intense heat produced during passage through the upper atmosphere at very high speed then melts a meteor's outside layer, but molten material is blown off and the interior does not have time to warm appreciably. Most meteorites fall through the relatively cool lower atmosphere for as long as several minutes at subsonic velocity before reaching the ground, giving plenty of time for their exterior to cool off again.^[200]
- When a meteor or spacecraft enters the atmosphere, the heat of entry is not (primarily) caused by friction, but by adiabatic compression of air in front of the object.^{[201][202][203]}
- Egg balancing is possible on every day of the year, not just the vernal equinox,^[204] and there is no relationship between astronomical phenomena and the ability to balance an egg.^[205] The tradition of balancing eggs on a particular date originates in China, when it was reported on by *Life* magazine in 1945.^[206] However, it was reported in 1987 that Frank Ghigo was able to balance some eggs on every day from February 27 to April 3, 1984. At the same time, he also found that "...some eggs would simply never balance, on the equinox or otherwise."^[205]
- The Sun's color is white, with a CIE color-space index near (0.3, 0.3), when viewed from space or when high in the sky; when low in the sky, atmospheric scattering renders the Sun's appearance yellow, red, orange, or magenta. Despite its typical whiteness, most people mentally picture the Sun as yellow; the reasons for this are the subject of debate.^[207]



A satellite image of a section of the Great Wall of China, running diagonally from lower left to upper right (not to be confused with the much more prominent river running from upper left to lower right). The region pictured is 12 by 12 kilometres (7.5 mi × 7.5 mi).

Biology

Vertebrates

- Older elephants that are near death do not leave their herd and instinctively direct themselves toward a specific location known as an elephants' graveyard to die.^[208]
- Bulls are not enraged by the color red, used in capes by professional matadors. Cattle are dichromats, so red does not stand out as a bright color. It is not the color of the cape, but the perceived threat by the matador that incites it to charge.^[209]
- Dogs do not sweat by salivating.^[210] Dogs actually do have sweat glands and not only on their tongues; they sweat mainly through their footpads. However, dogs do primarily regulate their body temperature through panting.^[211] See also *Dog anatomy*.
- Lemmings do not engage in mass suicidal dives off cliffs when migrating. This misconception was popularized by the Disney film *White Wilderness*, which shot many of the migration scenes (also staged by using multiple shots of different groups of lemmings) on a large, snow-covered turntable in a studio. Photographers later pushed the lemmings off a cliff.^[212] The misconception itself is much older, dating back to at least the late 19th century.^[213]
- Bats are not blind. While about 70 percent of bat species, mainly in the microbat family, use echolocation to navigate, all bat species have eyes and are capable of sight. In addition, almost all bats in the megabat or fruit bat family cannot echolocate and have excellent night vision.^[214]
- Ostriches do not stick their heads in the sand to hide from enemies.^[215] This misconception was probably promulgated by Pliny the Elder (23–79 CE), who wrote that ostriches "imagine, when they have thrust their head and neck into a bush, that the whole of their body is concealed."^[216]
- A duck's quack actually does echo,^[217] although the echo may be difficult to hear for humans under some circumstances.^[218]
- Frogs die immediately when cast into boiling water, rather than leaping out; furthermore, frogs will attempt to escape cold water that is slowly heated past their critical thermal maximum.^[219]
- The notion that goldfish have a memory span of just a few seconds is false.^{[220][221]} It is much longer, counted in months.
- Sharks can suffer from cancer. The misconception that sharks do not get cancer was spread by the 1992 Avery Publishing book *Sharks Don't Get Cancer* by I. William Lane and used to sell extracts of shark cartilage as cancer prevention treatments. Reports of carcinomas in sharks exist, and current data do not allow any speculation about the incidence of tumors in sharks.^[222]
- Great white sharks do not mistake human divers for pinnipeds. Their attack behaviors on humans and pinnipeds are very different: when attacking a seal, a great white shark surfaces quickly and violently attacks it. Attacks on humans, on the other hand, are more relaxed and slow: the shark charges at a normal pace, bites, and swims off. Great white sharks have efficient eyesight and color vision; the bite is not predatory, but rather for identification of an unfamiliar object.^[223]



The color of a red cape does not enrage a bull

Invertebrates

- Earthworms do not become two worms when cut in half. Only a limited number of earthworm species^[224] are capable of anterior regeneration. When such earthworms are bisected, only the front half of the worm (where the mouth is located) can feed and survive, while the other half dies.^[225] Some species of planarian flatworms, however, actually *do* become two new planarians when bisected or split down the middle.^[226]
- Houseflies have an average lifespan of 20 to 30 days, not 24 hours.^[227] Some species of mayflies do have the lifespan attributed to the housefly. A housefly maggot will hatch within 24 hours of being laid.^[228]
- The daddy longlegs spider (*Pholcidae*) is not the most venomous spider in the world, and they can indeed pierce human skin, though the tiny amount of venom they carry causes only a mild burning sensation for a few seconds.^[229] In addition, there is also confusion regarding the use of the name *daddy longlegs*, because harvestmen (order *Opiliones*, which are arachnids, but not spiders) and crane flies (which are insects) are also known as *daddy longlegs*, and share the misconception of being venomous.^{[230][231]}
- The flight mechanism and aerodynamics of the bumblebee (as well as other insects) are actually quite well understood, despite the urban legend that calculations show that they should not be able to fly. In the 1930s, the French entomologist Antoine Magnan indeed postulated that bumblebees theoretically should not be able to fly in his book *Le Vol des Insectes (The Flight of Insects)*.^[232] Magnan later realized his error and retracted the suggestion. However, the hypothesis became generalized to the false notion that "scientists think that bumblebees should not be able to fly".
- The widespread urban legend that one swallows a high number of spiders during sleep in one's life has no basis in reality. A sleeping person causes all kinds of noise and vibrations by breathing, the beating heart, snoring etc. all of which warn spiders of danger.^{[233][234]}



Bombus pratorum over an *Echinacea purpurea* inflorescence; a widespread misconception holds that bumblebees should be incapable of flight.

Plants

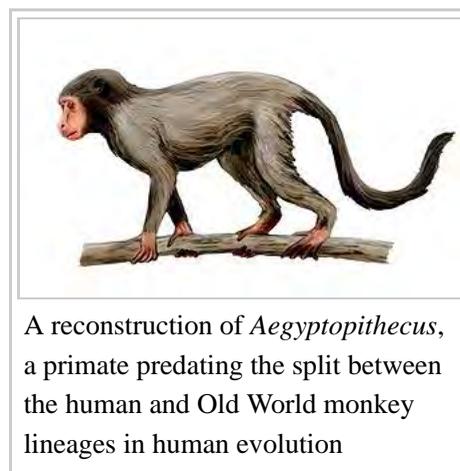
- Poinsettias are not highly toxic to humans or cats. While it is true that they are mildly irritating to the skin or stomach,^[235] and may sometimes cause diarrhea and vomiting if eaten,^[236] an *American Journal of Emergency Medicine* study of 22,793 cases reported to the American Association of Poison Control Centers showed no fatalities and few cases requiring medical treatment.^[237] According to the ASPCA, poinsettias may cause light to mid-range gastrointestinal discomfort in felines, with diarrhea and vomiting as the most severe consequences of ingestion.^[238]
- Flowering sunflowers point in a fixed direction (often east) all day long.^{[239][240][241]} However, in an earlier developmental stage, before the appearance of flower heads, the immature buds *do* track the sun (a phenomenon called heliotropism) and the fixed alignment of the mature flowers toward a certain direction is often the result.^[242]



Sunflowers with the sun clearly visible *behind* them.

Evolution and palaeontology

- The word *theory* in "the theory of evolution" does not imply mainstream scientific doubt regarding its validity; the concepts of *theory* and *hypothesis* have specific meanings in a scientific context. While *theory* in colloquial usage may denote a hunch or conjecture, a *scientific theory* is a set of principles that explains *observable phenomena* in natural terms.^{[243][244]} "Scientific fact and theory are not categorically separable",^[245] and evolution is a theory in the same sense as germ theory or the theory of gravitation.^[246]
- Evolution does not attempt to explain the origin of life^[247] or the origin and development of the universe. While biological evolution describes the process by which species and other levels of biological organization originate, and ultimately leads all life forms back to a universal common ancestor, it is not primarily concerned with the origin of life itself,^[248] and does not pertain at all to the origin and evolution of the universe and its components. The theory of evolution deals primarily with changes in successive generations over time after life has already originated.^[249] The scientific model concerned with the origin of the first organisms from organic or inorganic molecules is known as abiogenesis, and the prevailing theory for explaining the early development of our universe is the Big Bang model.
- Humans did not evolve from either of the living species of chimpanzees.^[250] Humans and chimpanzees did, however, evolve from a *common ancestor*.^{[251][252]} The two modern species (common chimpanzees and bonobos) are humans' closest living relatives. Some anthropologists and primatologists describe humans as a species of chimpanzee.^{[253][254]} The most recent common ancestor of humans and the other living chimpanzees lived between 5 and 8 million years ago.^[255] Finds of the 4.4 million-year-old *Ardipithecus* indicate the ancestor was a moderately competent bipedal walker rather than a knucklewalker, and was small and rather more long-limbed than a chimpanzee, with a shorter snout. Contrary to the idea of chimpanzees as "primitive", they too have evolved since the split, becoming larger, more aggressive, and more capable climbers,^[256] with longer fingers.^[257] Together with the other great apes, humans and chimpanzees constitute the family Hominidae. This group evolved from a common ancestor with the Old World monkeys some 40 million years ago.^{[258][259]}
- Evolution is not a progression from inferior to superior organisms, and it also does not necessarily result in an increase in complexity. A population can evolve to become simpler, having a smaller genome, but biological *devolution* is a misnomer.^{[260][261]}
- Evolution does not "plan" to improve an organism's fitness to survive.^{[262][263]} For example, an incorrect way to describe giraffe evolution is to say that giraffe necks grew longer over time because giraffes needed to reach tall trees. Evolution does not see a need and respond; it is instead a goalless process. A mutation resulting in longer necks would be more likely to benefit an animal in an area with tall trees than an area with short trees, and thus enhance the chance of the animal surviving to pass on its longer-necked genes. Tall trees could not cause the mutation nor would they cause a higher percentage of animals to be born with longer necks.^[264] In the giraffe example, the evolution of a long neck may equally well have been driven by sexual selection, proposing that the long necks evolved as a secondary sexual characteristic, giving males an advantage in "necking" contests over females.^[265] The



A reconstruction of *Aegyptopithecus*, a primate predating the split between the human and Old World monkey lineages in human evolution

misconception is encouraged as it is common shorthand for people who understand how evolution works to speak of a purpose as a concise form of expression (sometimes called the "metaphor of purpose");^[266] it is less cumbersome to say "Dinosaurs may have evolved feathers for courtship" than "Feathers may have been selected for when they arose as they gave dinosaurs a selective advantage over their non-feathered peers".^[267]

- Humans and dinosaurs (other than birds) did not coexist.^[268] The last of the non-avian dinosaurs died 66 million years ago in the course of the Cretaceous–Paleogene extinction event, whereas the earliest *Homo* genus (humans) evolved between 2.3 and 2.4 million years ago. This places a 63-million-year expanse of time between the last non-bird dinosaurs and the earliest humans. Humans did coexist with woolly mammoths and saber-toothed cats—mammals which are often depicted alongside humans and dinosaurs.^[269]
- Dinosaurs did not become extinct due to being generally maladapted or unable to cope with normal climatic change, a view found in many older textbooks. In fact, dinosaurs comprised an extremely adaptive and successful group whose demise was brought about by an extraordinary event that also extinguished many groups of plants, mammals and marine life.^[270] The most commonly cited cause of this mass extinction is an asteroid impact on the Yucatán Peninsula, triggering the Cretaceous–Paleogene extinction event.^[271] Also, not all dinosaurs became extinct. Birds evolved from small feathered theropods in the Jurassic, and while most dinosaur lineages were cut short at the end of the Cretaceous, some birds survived. Consequently, dinosaur descendants are part of the modern fauna.^[272]
- Mammals did not evolve from any modern group of reptiles; rather, mammals and reptiles evolved from a common ancestor. Soon after the first reptile-like animals appeared, they split into two branches, the sauropsids and the synapsids.^[273] The line leading to mammals (the synapsids) diverged from the line leading to modern reptilian lines (the sauropsids) about 320 million years ago, in the mid-Carboniferous period. Only later (in the late Carboniferous or early Permian) did the modern reptilian groups (lepidosaurs, turtles and crocodiles) diverge. The mammals themselves are the only survivors of the synapsid line.^[274]



Tyrannosaurus rex. Non-avian dinosaurs died out in the Cretaceous–Paleogene extinction event at the end of the Cretaceous period.

Computing

- Computers running macOS or Linux are not immune to malware such as trojan horses or computer viruses. However, there is less malware in circulation for these operating systems because malware must be designed for a particular operating system, and Microsoft Windows is more common.^[275]

Human body and health

- Waking sleepwalkers does not harm them. While it is true that a person may be confused or disoriented for a short time after awakening, this does not cause them further harm. In contrast, sleepwalkers may injure themselves if they trip over objects or lose their balance while sleepwalking. Such injuries are common among sleepwalkers.^{[276][277]}
- In South Korea, it is commonly and incorrectly believed that sleeping in a closed room with an electric fan running can cause what is called fan death. According to the Korean government, "In some cases, a

fan turned on too long can cause death from suffocation, hypothermia, or fire from overheating."^[278] The Korea Consumer Protection Board issued a consumer safety alert recommending that electric fans be set on timers, direction changed and doors left open. Belief in fan death is common even among knowledgeable medical professionals in Korea. According to Yeon Dong-su, dean of Kwandong University's medical school, "If it is completely sealed, then in the current of an electric fan, the temperature can drop low enough to cause a person to die of hypothermia."^[279] Actually, a fan just moves air without significantly changing its temperature, to increase the evaporation of sweat. Leaving a fan running in an unoccupied room will not cool it; in fact, due to energy losses from the motor and viscous dissipation, a fan will slightly heat a room.



Electric fans in South Korea commonly feature a timer, due to a widely held misconception that leaving them on while asleep can be fatal

- Eating less than an hour before swimming does not increase the risk of experiencing muscle cramps or drowning. One study shows a correlation between alcohol consumption and drowning, but there is no evidence cited regarding stomach cramps or the consumption of food.^[280]
- Drowning is often inconspicuous to onlookers.^[281] In most cases, raising the arms and vocalising are impossible due to the instinctive drowning response.^[281] Waving and yelling (known as "aquatic distress") is a sign of trouble, but not a dependable one: most victims demonstrating the instinctive drowning response do not show prior evidence of distress.^[282]
- Human blood in veins is not actually blue. In fact, blood is always red due to hemoglobin. Deoxygenated blood has a deep red color, and oxygenated blood has a light cherry-red color. The misconception probably arises for two reasons: 1) Veins below the skin appear blue. This is due to a variety of reasons only weakly dependent on the color of the blood, including subsurface scattering of light through the skin, and human color perception. 2) Many diagrams use colors to show the difference between veins (usually shown in blue) and arteries (usually shown in red).^[283]
- Exposure to a vacuum, or experiencing uncontrolled decompression, does not cause the body to explode, or internal fluids to boil. (However, fluids in the mouth or lungs will boil at altitudes above the Armstrong limit.) Instead, it would lead to a loss of consciousness once the body has depleted the supply of oxygen in the blood, followed by death from hypoxia within minutes.^[284]
- Diet has little influence on the body's detoxification. Despite this, there is a common misconception that specific diets aid this process and can remove substances that the body is unable to remove by itself.^{[285][286][287][288]} Toxins are removed from the body by the liver and kidney.^[289]

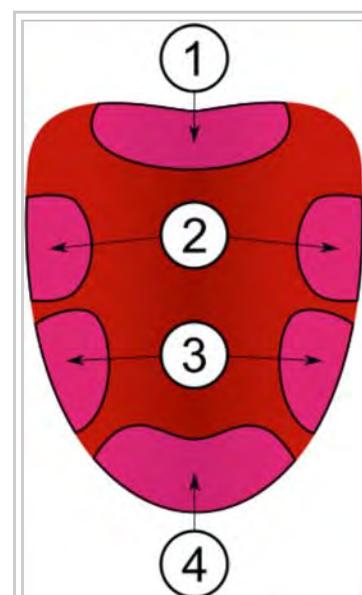
Senses

- All different tastes can be detected on all parts of the tongue by taste buds,^[290] with slightly increased sensitivities in different locations depending on the person, contrary to the popular belief that specific tastes only correspond to specific mapped sites on the tongue.^[291] The original tongue map was based on a mistranslation of a 1901 German thesis^[292] by Edwin Boring. In addition, the current common categorical conception is there are not 4 but 5 primary tastes. In addition to bitter, sour, salty, and sweet, humans have taste receptors for umami, which is a savory or meaty taste.^[293]
- Humans have more than the commonly cited five senses. The number of senses in various categorizations ranges from 5 to more than 20. In addition to sight, smell, taste, touch, and hearing,

which were the senses identified by Aristotle, humans can sense balance and acceleration (equilibrioception), pain (nociception), body and limb position (proprioception or kinesthetic sense), and relative temperature (thermoception).^[294] Other senses sometimes identified are the sense of time, itching, pressure, hunger, thirst, fullness of the stomach, need to urinate, need to defecate, and blood carbon dioxide levels.^{[295][296]}

Skin and hair

- Water-induced wrinkles are not caused by the skin absorbing water and swelling.^[297] They are caused by the autonomic nervous system, which triggers localized vasoconstriction in response to wet skin, yielding a wrinkled appearance. This was theorized to have evolved to give ancestral primates a better grip in slippery, wet environments,^{[298][299]} but a 2014 study showed no improvement in handling wet objects with wrinkled fingertips.^[300]
- Shaving does not cause terminal hair to grow back thicker or coarser or darker. The hair only becomes wider and feels coarser. This belief is due to hair which has never been cut having a tapered end, whereas after cutting the edge is blunt and therefore *wider* than the tapered ends; the cut hair appears to be thicker and feels coarser due to the sharper, unworn edges. The shorter hairs being "harder" (less flexible) than longer hairs also contributes to this effect.^[301]
- Hair and fingernails do not continue to grow after a person dies. Rather, the skin dries and shrinks away from the bases of hairs and nails, giving the appearance of growth.^[302]
- Hair care products cannot actually "repair" split ends and damaged hair. They can prevent damage from occurring in the first place, and they can also smooth down the cuticle in a glue-like fashion so that it appears repaired, and generally make hair appear in better condition.^[303]
- The redhead gene is not becoming extinct. In August 2007, many news organizations reported that redheads would become extinct, possibly as early as 2060, due to the gene for red hair being recessive. Although redheads may become more rare (for example, mixed marriages where one parent is from a group without the redhead gene will result in no redheaded children, but some redheaded grandchildren), redheads will not die out unless everyone who carries the gene dies or fails to reproduce.^[304] This misconception has been around since at least 1865, and often resurfaces in American newspapers.^[305] (See also Disappearing blonde gene.)



An incorrect map of the tongue showing zones which taste bitter (1), sour (2), salty (3) and sweet (4). In reality, all zones can sense all tastes.

Nutrition, food, and drink

- Eight glasses or two to three liters of water a day are not needed to maintain health.^[306] The amount of water needed varies by person (weight), activity level, clothing, and environment (heat and humidity). Water actually need not be drunk in pure form, but can be derived from liquids such as juices, tea, milk, soups, etc., and from foods including fruits and vegetables.^[306]
- Sugar does not cause hyperactivity in children.^{[307][308]} Double-blind trials have shown no difference in behavior between children given sugar-full or sugar-free diets, even in studies specifically looking at children with attention-deficit/hyperactivity disorder or those considered sensitive to sugar.^[309]
- Alcoholic beverages do not make the entire body warmer.^[310] The reason that alcoholic drinks create the

sensation of warmth is that they cause blood vessels to dilate and stimulate nerve endings near the surface of the skin with an influx of warm blood. This can actually result in making the core body temperature lower, as it allows for easier heat exchange with a cold external environment.^[311]

- Alcohol does not necessarily kill brain cells.^[312] Alcohol can, however, lead *indirectly* to the death of brain cells in two ways: (1) In chronic, heavy alcohol users whose brains have adapted to the effects of alcohol, abrupt cessation following heavy use can cause excitotoxicity leading to cellular death in multiple areas of the brain.^[313] (2) In alcoholics who get most of their daily calories from alcohol, a deficiency of thiamine can produce Korsakoff's syndrome, which is associated with serious brain damage.^[314]
- A vegetarian or vegan diet can provide enough protein for adequate nutrition.^{[315][316]} In fact, typical protein intakes of ovo-lacto vegetarians and vegans meet and exceed requirements.^[317] However, a vegan diet does require supplementation of vitamin B₁₂ for optimal health.^[315]
- Swallowed chewing gum does not take seven years to digest. In fact, chewing gum is mostly indigestible, and passes through the digestive system at the same rate as other matter.^{[318][319]}
- Evidence does not support a significant role for spicy food or coffee in the development of peptic ulcers.^[320]
- While the beta carotene in carrots can help improve night vision in those suffering from a deficiency of vitamin A, it does not enhance it beyond normal levels in those receiving an adequate amount.^[321] The belief that it does originated from World War II British disinformation meant to explain the Royal Air Force's improved success in night battles, which was actually due to radar and the use of red lights on instrument panels.^[322]

Human sexuality

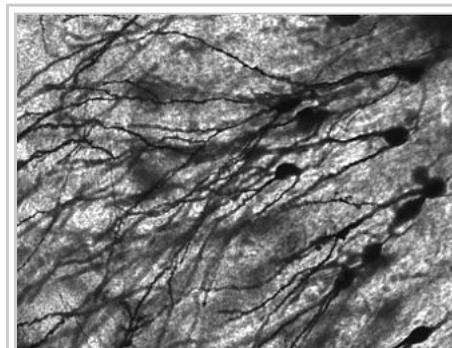
- There is no physiological basis for the belief that having sex in the days leading up to a sporting event or contest is detrimental to performance.^[323] In fact it has been suggested that sex prior to sports activity can elevate the levels of testosterone in males, which could potentially enhance their performance.^[324]
- Pregnancies from sex between first cousins do not carry a serious risk of birth defects:^[325] 5–6%, similar to that of a 40-year-old woman,^{[325][326]} compared with a baseline risk of 3–4%.^[326]

Brain

- Mental abilities are not absolutely separated into the left and right cerebral hemispheres of the brain.^[327] Some mental functions such as speech and language (e.g. Broca's area, Wernicke's area) tend to activate one hemisphere of the brain more than the other, in some kinds of tasks. If one hemisphere is damaged at an early age, these functions can often be recovered in part or even in full by the other hemisphere (see Neuroplasticity). Other abilities such as motor control, memory, and general reasoning are served equally by the two hemispheres.^[328]
- It is not true that by the age of two years, humans have generated all of the brain cells they will ever have, a belief held by medical experts until 1998.^{[329][330][331]} It is now understood that new neurons can be created in some parts of the postnatal brain. Researchers have observed adult neurogenesis in avians,^[332] Old World monkeys,^[333] and humans.^[334] Adults of these species retain multipotent (see cell potency) neural stem cells in the subventricular zone of the lateral ventricles and subgranular zone of the dentate gyrus.^{[335][336]} The newborn neurons generated in these areas migrate to the olfactory bulb and the dentate gyrus, respectively, and are believed to integrate into existing neural circuits. The

function and physiological significance of adult-born neurons remains unclear. Some studies have suggested that post-natal neurogenesis also occurs in the neocortex,^{[337][338][339]} an idea that is disputed.^[340]

- Vaccines do not cause autism or autism spectrum disorders. Although fraudulent research by Andrew Wakefield claimed a connection, repeated attempts to reproduce the results ended in failure, and the research was ultimately shown to have been manipulated.^[341]
- People do not use only ten percent of their brains. While it is true that a small minority of neurons in the brain are actively firing at any one time, the inactive neurons are important too.^{[342][343]} This misconception has been commonplace in American culture at least as far back as the start of the 20th century, and was attributed to William James, who apparently used the expression metaphorically.^[344]
- All humans learn in fundamentally similar ways.^[345] In particular, there is no evidence that people have different learning styles,^[345] nor that catering teaching styles to purported learning styles improves information retention.^[346]



Golgi-stained neurons in human hippocampal tissue. It is commonly believed that humans will not grow new brain cells, but research has shown that some neurons can reform in humans.

Disease

- Drinking milk or consuming other dairy products does not increase mucus production.^{[347][348]} As a result, they do not need to be avoided by those with the flu or cold congestion.
- Humans cannot catch warts from toads or other animals; the bumps on a toad are not warts.^[349] Warts on human skin are caused by viruses that are unique to humans (human papillomavirus).
- Neither cracking one's knuckles nor exercising while in good health causes osteoarthritis.^{[350][351]}
- Eating nuts, popcorn, or seeds does not increase the risk of diverticulitis.^[352] These foods may actually have a protective effect.^[353]
- Stress plays a relatively minor role in hypertension.^[354] Specific relaxation therapies are not supported by the evidence.^[355] *Acute* stress has been shown to *temporarily* increase blood-pressure levels.^[354] Evidence from observational studies has shown a possible association between chronic stress and a sustained rise in high blood-pressure.^[354] From the medical perspective, stress plays a small part in hypertension, whereas a recurring theme in studies of the attitudes of lay people was that stress was by far the most important cause.^[354]
- In those with the common cold, the color of the sputum or nasal secretion may vary from clear to yellow to green and does not indicate the class of agent causing the infection.^{[356][357]}
- In general, Vitamin C does not prevent the common cold, although it may have a protective effect during intense cold-weather exercise and may slightly reduce the duration and severity of colds once infected.^{[358][359]}



The bumps on a toad are not warts, and therefore cannot cause warts on humans

- In people with eczema, bathing does not dry the skin and may in fact be beneficial.^{[360][361]}
- There are not, nor have there ever been, any programs that will provide access to dialysis machines in exchange for pull tabs on beverage cans.^[362] This rumor has existed since at least the 1970s, and usually cites the National Kidney Foundation as the organization offering the program. However, the Foundation themselves have denied that this is the case, noting that 80 percent of the cost of dialysis in the United States is usually covered by Medicare.^[363] However some charities, such as the Kansas City Ronald McDonald House Charities, will accept pull tab donations, which are then turned over to a local recycler for their scrap metal value.^[364]
- Rhinoceros horn in powdered form is not used as an aphrodisiac in Traditional Chinese Medicine (TCM) as *Cornu Rhinoceri Asiatici* (犀角, *xījiǎo*, "rhinoceros horn"). It is in fact prescribed for fevers and convulsions,^[365] a treatment not supported by evidence-based medicine.
- Rust does not cause tetanus infection. Rust can normally be found outside or in other places that harbor the *Clostridium tetani* bacterium, but rust itself does not cause tetanus.^[366]

Inventions

- George Washington Carver did not invent peanut butter, though he reputedly discovered three hundred uses for peanuts and hundreds more for soybeans, pecans, and sweet potatoes.^{[367][368]}
- Thomas Crapper did not invent the flush toilet;^[369] flushing toilets were first used in the Indus Valley Civilization, around the 26th century BCE.^[370] The forerunner of the modern toilet was invented by the Elizabethan courtier Sir John Harington, who was banished from court when his book on the subject poked fun at important people.^[371] Crapper, however, did much to increase its popularity and came up with some related inventions, such as the ballcock mechanism used to fill toilet tanks. The word *crap* is also not derived from his name (see the Words and phrases section above).^[372]
- Thomas Edison did not invent the light bulb.^[373] He did, however, develop the first *practical* light bulb in 1880 (employing a carbonized bamboo filament), shortly prior to Joseph Swan, who invented an even more efficient bulb in 1881 (which used a cellulose filament).
- Henry Ford did not invent either the automobile or the assembly line. He did improve the assembly line process substantially, sometimes through his own engineering but more often through sponsoring the work of his employees.^{[374][375]} Karl Benz (co-founder of Mercedes-Benz) is credited with the invention of the first modern automobile,^[376] and the assembly line has existed throughout history.
- Benjamin Franklin did not invent or propose daylight saving time. In fact, 18th-century Europe did not even keep precise schedules.^[377]
- Guglielmo Marconi did not invent the radio, but only modernized it for public broadcasting and communication.^[378] For more about the controversy about who invented radio technology, see invention of radio.
- Al Gore never said that he "invented" the Internet. What Gore actually said was, "During my service in the United States Congress, I took the initiative in creating the Internet", in reference to his political work towards developing the Internet for widespread public use.^{[379][380]} Gore was the original drafter of



Thomas Crapper did not invent the flushing toilet, nor does the word *crap* derive from his name.

the High Performance Computing and Communication Act of 1991, which provided significant funding for supercomputing centers, and this in turn led to upgrades of a major part of the already-existing early 1990s Internet backbone, the NSFNet, and development of NCSA Mosaic, the browser that popularized the World Wide Web. (Also see Al Gore and information technology.)

- James Watt did not invent the steam engine,^[381] nor were his ideas on steam engine power inspired by a kettle lid pressured open by steam.^[382] Watt developed upon the first commercially successful Newcomen steam engine in the 1760s and 1770s, making certain improvements critical to its future usage, particularly the external condenser, increasing its efficiency, and the mechanism for transforming reciprocating motion into rotary motion; his new steam engine later gained huge fame as a result.^[383]

Materials science

- Glass does not flow at room temperature as a high-viscosity liquid.^[384] Although glass shares some molecular properties found in liquids, glass at room temperature is an "amorphous solid" that only begins to flow above the glass transition temperature,^[385] though the exact nature of the glass transition is not considered settled among scientists.^[386] Panes of stained glass windows are often thicker at the bottom than at the top, and this has been cited as an example of the slow flow of glass over centuries. However, this unevenness is due to the window manufacturing processes used at the time. Normally the thick end of glass would be installed at the bottom of the frame, but it is also common to find old windows where the thicker end has been installed to the sides or the top.^{[385][386]} No such distortion is observed in other glass objects, such as sculptures or optical instruments, that are of similar or even greater age. One researcher estimated in 1998 that for glass to actually flow at room temperatures would require a length of time many times the age of the Earth.^{[385][386][387]}
- Most diamonds are not formed from highly compressed coal. More than 99 percent of diamonds ever mined have formed in the conditions of extreme heat and pressure about 90 miles (140 km) below the Earth's surface. Coal is formed from prehistoric plants buried much closer to the surface, and is unlikely to migrate below 2 miles (3.2 km) through common geological processes. Most diamonds that have been dated are older than the first land plants, and are therefore older than coal. It is possible that diamonds can form from coal in subduction zones and in meteoroid impacts, but diamonds formed in this way are rare and the carbon source is more likely carbonate rocks and organic carbon in sediments, rather than coal.^[388]

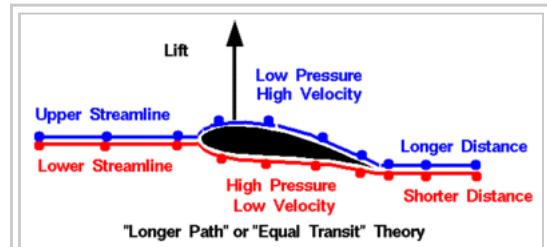
Mathematics

- There is no evidence that the ancient Greeks designed the Parthenon to deliberately match the golden ratio.^{[389][390]} The Parthenon was completed in 438 BC, more than a century before the first recorded mention of the ratio by Euclid. Similarly, Leonardo da Vinci's *Vitruvian Man* makes no mention of the golden ratio in its text, although it describes many other proportions.^{[391][392]}

Physics

- It is not true that air takes the same time to travel above and below an aircraft's wing.^[393] This misconception, sometimes called the equal transit-time fallacy, is widespread among textbooks and non-technical reference books, and even appears in pilot training materials. In fact the air moving over the top of an airfoil generating lift is always moving much faster than the equal transit theory would imply,^[393] as described in the incorrect and correct explanations of lift force.

- Blowing over a curved piece of paper does not demonstrate Bernoulli's principle. Although a common classroom experiment is often explained this way,^[394] it is false to make a connection between the flow on the two sides of the paper using Bernoulli's equation since the air above and below are different flow fields and Bernoulli's principle only applies within a flow field.^[395] The paper rises because the air follows the curve of the paper and a curved streamline will develop pressure differences perpendicular to the airflow.^[396] Bernoulli's principle predicts that the decrease in pressure is associated with an increase in speed, i.e. that as the air passes over the paper it speeds up and moves faster than it was moving when it left the demonstrator's mouth. But this is not apparent from the demonstration.^[397]



An illustration of the (incorrect) equal-transit-time explanation of airfoil lift

- Water does not consistently drain in a counter-clockwise vortex in basins in the Northern Hemisphere and clockwise in the Southern due to the Coriolis effect. The claim that the Coriolis effect is far too weak to influence the draining of liquid from a basin is also incorrect.^{[398][399][400]} The Coriolis effect is indeed real and does impact the draining, but its impact is tiny compared to that of residual current, debris or imperfections in the basin, or a host of other possible factors, and sinks may be found draining either counter-clockwise or clockwise on either side of the equator.^[401] Nevertheless, a team led by Ascher Shapiro and MIT filled a special cylindrical tank with water, sealed it, and let it sit for a day; when drained, it eventually did form a clear counter-clockwise whirlpool, which confirmed the hypothesis that the Coriolis effect does impact even small-scale drains. (The experiment was successfully repeated multiple times elsewhere in the Northern Hemisphere; identical tests in Sydney produced the opposite effect, as predicted.)^[402]
- Gyroscopic forces or geometric trail are not required for a rider to balance a bicycle or for it to demonstrate self-stability.^{[403][404]} Although gyroscopic forces and trail can be contributing factors, it has been demonstrated that those factors are neither required nor sufficient by themselves.^[403]
- The idea that lightning never strikes the same place twice is one of the oldest and best known superstitions about lightning. There is no reason that lightning would not be able to strike the same place twice; if there is a thunderstorm in a given area, then objects and places which are more prominent or conductive (and therefore minimize distance) are more likely to be struck. For instance, lightning strikes the Empire State Building in New York City about 100 times per year.^{[405][406]}
- A penny dropped from the Empire State Building will not kill a person or crack the sidewalk.^[407] The terminal velocity of a falling penny is about 30–50 miles per hour (50–80 km/h), and the penny will not exceed that speed regardless of the height from which it is dropped. At that speed, its energy is not enough to penetrate a human skull or crack concrete, as demonstrated on an episode of *MythBusters*. As *MythBusters* noted, the Empire State Building is a particularly poor setting for this misconception, since its tapered shape would make it impossible to drop anything directly from the top to street level. *Mythbusters* also pointed out that this doesn't mean that dropping coins from high altitude is safe. It might still cause harm.
- When the ambient temperature is low, temporarily decreasing the temperature setting on a building's programmable thermostat (e.g. at night or when it is unoccupied) rather than maintaining a steady temperature can save a significant amount of energy.^[408] A common myth is that if the building is allowed to cool, its furnace has to "work harder" to reheat it to a comfortable temperature, counteracting or even exceeding the energy saved while the temperature was allowed to drop. Actually this practice can result in energy savings of five to fifteen percent as the heat lost by a warm structure in a cold

environment is proportional to the temperature difference between the inside and outside of the structure.

Psychology

- Dyslexia is not a cognitive disorder characterized by the reversal of letters or words and mirror writing. It is a disorder of people who have at least average intelligence and who have difficulty in spelling words, reading quickly, writing words, "sounding out" words in the head, pronouncing words when reading aloud and understanding what they read. Although some dyslexics also have problems with letter reversal, that is not a symptom that is characteristic of dyslexia.^[409]
- There is no scientific evidence for the existence of "photographic" memory in adults (the ability to remember images with so high a precision as to mimic a camera),^[410] but some young children have eidetic memory.^[411] Many people have claimed to have a photographic memory, but those people have been shown to have good memories as a result of mnemonic devices rather than a natural capacity for detailed memory encoding.^[412] There are rare cases of individuals with exceptional memory, but none of them have a memory that mimics a camera.
- Schizophrenia is not the same thing as dissociative identity disorder, namely split or multiple personalities.^[413] Etymologically, the term "schizophrenia" comes from the Greek roots *skhizein* (σχίζειν, "to split") and *phrēn*, *phren-* (φρήν, φρεν-; "mind") and is a juxtaposition proposed by the Swiss psychiatrist Eugen Bleuler, which may have given rise to this common misconception.

Transportation

- Toilet waste is never intentionally jettisoned from an aircraft. All waste is collected in tanks which are emptied on the ground by toilet waste vehicles.^[414] Blue ice is caused by accidental leakage from the waste tank. Passenger trains, on the other hand, have indeed historically flushed onto the tracks; modern trains usually have retention tanks on board and therefore do not dispose of waste in such a manner.
- Automotive batteries stored on a concrete floor do not discharge any faster than they would on other surfaces,^[415] in spite of worry among Americans that concrete harms batteries.^[416] Early batteries might have been susceptible to moisture from floors due to leaky, porous cases, but for many years lead–acid car batteries have had impermeable polypropylene cases,^[417] and are maintenance-free, so they do not leak battery acid.^{[418][419]}

See also

- Conventional wisdom
- Counterintuitive
- Factoid
- List of cognitive biases
- List of fallacies
- List of topics characterized as pseudoscience
- *MythBusters*
- Old wives' tale
- Outline of public relations
- *Pseudodoxia Epidemica*
- Pseudoscience
- *QI*
- Snopes.com
- Stereotype
- The Straight Dope
- Superstition
- Urban legend
- Urban legends about drugs

Notes

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- "The well-known demonstration of the phenomenon of lift by means of lifting a page cantilevered in one's hand by blowing horizontally along it is probably more a demonstration of the forces inherent in the Coanda effect than a demonstration of Bernoulli's law; for, here, an air jet issues from the mouth and attaches to a curved (and, in this case pliable) surface. The upper edge is a complicated vortex-laden mixing layer and the distant flow is quiescent, so that Bernoulli's law is hardly applicable." David Auerbach *Why Aircraft Fly* European Journal of Physics Vol 21 p 289 http://iopscience.iop.org/0143-0807/21/4/302/pdf/0143-0807_21_4_302.pdf
- "Millions of children in science classes are being asked to blow over curved pieces of paper and observe that the paper "lifts"... They are then asked to believe that Bernoulli's theorem is responsible... Unfortunately, the "dynamic lift" involved...is not properly explained by Bernoulli's theorem." Norman F. Smith "Bernoulli and Newton in Fluid Mechanics" *The Physics Teacher* Nov 1972 http://tpt.aapt.org/resource/1/phteah/v10/i8/p451_s1?ver=pdfcov

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External links

- List of children's misconceptions about science (<http://amasci.com/miscon/opphys.html>)
- Misconceptions taught by science textbooks (<http://amasci.com/miscon/miscon4.html>)
- Bad Science (<http://www.ems.psu.edu/~fraser/BadScience.html>)
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